Description

Kinetic Harvester

Background of the Invention

1. Field of the Invention

The present invention relates generally to power generation and, in one of its aspects, to power generation from moving liquid such as ocean water.

2. Description of Related Art

In the late sixties, people foresaw the current energy shortage and began searching for an alternative source that would be clean, reliable, cheap and abundant. People knew that there was more than enough kinetic energy in the oceans to run our civilization if it could just be harnessed.

Summary of the Invention

The Kinetic Harvester is a simple, inexpensive, low tech device that is designed to tap the ocean's enormous kinetic energy that is inherent in tides and currents and waves and convert it to electrical energy. This kinetic energy is usually slow moving but very powerful. A three-mile per hour current has approximately fifteen pounds of lateral push per square foot. It is too slow moving to effectively turn a turbine so another approach is needed. The Kinetic harvester works by holding a large concave panel crosswise to the current. A surface twenty feet by twenty feet would have three tons of force against it. That force can be geared up enough to turn a good-sized generator at optimum speed.

The basic Kinetic Harvester is a versatile device that can be tailored to many different environments. It can be employed in different mountings to take maximum advantage of any water movement. Because of its adaptability and varied size and

appearance I have not shown any dimensions but I foresee the most common size as about forty feet across with panels twenty feet square.

The Kinetic Harvester includes a central shaft connecting two large disks like wheels and an axle. Four long cylindrical arms radiate from the middle of the central shaft and end even with the edges of the disks. Four main braces connect the edges of the disks and the ends of the arms butt into them. A smaller secondary brace runs from the ends of the arms around the circumference of the structure.

Two large flat panels are attached to the each arm so that they are able to open and close like a book. There are stops running across the inner surfaces of the disks, down the central shaft and down the inner surfaces of the main braces. When the panels are opened they come up against the stops and are prevented from bending backward.

The secondary brace runs between the panels when they are closed and prevents them from both swinging the same way. Springs are mounted on the secondary braces where the panel frames close on them. The springs help to start the opening of the panels.

All the panels are mounted on the same sides of the arms so that they all open clockwise or all counterclockwise.

This drawing shows the placement of the stops in relation to the panels.

When the Kinetic Harvester is installed in a current the water pushes its way between the panels that have loose edges facing into it forcing them open. The material in the centers of the panels are pushed back into a concave shape that offers maximum resistance to the current. On the other side of the Harvester where the loose sides of the panels face away from the current the force of the water squeezes the panels together offering a minimum of resistance to the current. The difference in resistance turns the Harvester around its central shaft. As the Harvester rotates each set of panels opens and closes in turn as they come into the different positions relative to the current.

If the current reverses as it would in waves or surf, the panels would open and close on opposite sides of the Harvester and it would keep harvesting power. A flywheel and ratchet would even out the flow.

The ends of the central shafts are set in bearings that mount it in the various supporting structures where it would be deployed.

The rotation of the Harvester can be transmitted to the generator in a number of ways. The generator can be up out of the water or in a sealed chamber. The power would be carried away through watertight cables.

Shows one way that the Kinetic Harvester can be employed. There are many other ways. The Kinetic Harvester can be customized to suit the location. It can be made larger or smaller, wider or narrower. Several small ones lined up on a common central shaft could be deployed along a beach to tap the power of the surf. Giant Harvesters with panels of two thousand square feet can deployed in the Gulf Stream.

On the larger production models the hinges on the panels would be replaced by an arrangement where the arms themselves would become the hinge-pins and the panels would fit on them like the hinges on the pins. All metal parts would be coated with a polymer coating to protect them from the seawater.

These and other objects, advantages and features of this invention will be apparent from the following description taken with reference to the accompanying drawing, wherein is shown a preferred embodiment of the invention.

Brief Description of the Drawing

FIGURE 1 is a top perspective view of a basic support structure of the present invention, minus panels and stops;

FIGURE 2 is side view of a set of panels according to the present invention in an open position and in a closed position separated by a secondary brace according to the present invention;

FIGURE 3 is a side view of the relationship of a panel, a disk and stops according to the present invention;

FIGURE 4 is a top view of the present invention with all panels in the closed position;

FIGURE 5A is a front view of the present invention showing a pair of panels in the open position;

FIGURE 5B is a side view of the present invention according to Figure 5A;

FIGURE 6 is a top sectional view of the present invention in operation;

FIGURE 7 is a top view of the present invention showing the transmission of power to an electrical generator according to the present invention; and

FIGURE 8 is a top view of the present invention mounted on its side under a raft in accordance with the present invention.

Description of the Preferred Embodiments

The Kinetic Harvester is a simple, inexpensive, low tech device that is designed to tap the ocean's enormous kinetic energy that is inherent in tides and currents and waves and convert it to electrical energy. This kinetic energy is usually slow moving but very powerful. A three-mile per hour current has approximately fifteen pounds of lateral push per square foot. It is too slow moving to effectively turn a turbine so another approach is needed. The Kinetic harvester works by holding a large concave panel crosswise to the current. A surface twenty feet by twenty feet would have three tons of force against it. That force can be geared up enough to turn a good-sized generator at optimum speed.

The basic Kinetic Harvester is a versatile device that can be tailored to many different environments. It can be employed in different mountings to take maximum advantage of any water movement. Because of its adaptability and varied size and appearance I have not shown any dimensions but I foresee the most common size as about forty feet across with panels twenty feet square.

Referring now to Figure 1, a Kinetic Harvester according to the present invention, referred to generally by reference numeral 10, includes a central shaft 12 connecting two large disks 14 and 16 like wheels and an axle. Four long cylindrical arms 18, 20, 22 and 24 radiate from the middle of the central shaft and end even with the edges of the disks. Four main braces 26, 28, 30 and 32 connect the edges of the disks and the ends of the arms butt into them. A smaller secondary brace 34, 36, 38 and 40 runs from the ends of the arms around the circumference of the structure.

Referring also to Figure 2 and Figure 3, two large flat panels 42 and 44 are attached to the each arm so that they are able to open and close like a book. There are stops 46 and 48 running across the inner surfaces of the disks, down the central shaft and down the inner surfaces of the main braces. When the panels are opened they come up against the stops and are prevented from bending backward.

The secondary brace runs between the panels when they are closed and prevents them from both swinging the same way. Springs are mounted on the secondary braces where the panel frames close on them. The springs help to start the opening of the panels. Alternatively, hinges 50 and 52 could be spring loaded.

Referring also to Figure 4, all the panels are mounted on the same sides of the arms so that they all open clockwise or all counterclockwise.

Referring to Figure 5, this drawing shows the placement of the stops in relation to the panels.

Referring now to Figure 6, when the Kinetic Harvester is installed in a current 54 the water pushes its way between the panels that have loose edges facing into it forcing them open. The material in the centers of the panels are pushed back into a concave shape that offers maximum resistance to the current. On the other side of the Harvester where the loose sides of the panels face away from the current the force of the water squeezes the panels together offering a minimum of resistance to the current. The difference in resistance turns the Harvester around its central

shaft in a direction 56. As the Harvester rotates each set of panels opens and closes in turn as they come into the different positions relative to the current.

If the current reverses as it would in waves or surf, the panels would open and close on opposite sides of the Harvester and it would keep harvesting power. A flywheel and ratchet would even out the flow.

The ends of the central shafts are set in bearings that mount it in the various supporting structures where it would be deployed.

Referring also to Figure 7, the rotation of the Harvester can be transmitted to a generator 58 in a number of ways. The generator can be up out of the water or in a sealed chamber. The power would be carried away through watertight cables.

Referring now to Figure 8, one way that the Kinetic Harvester can be employed is by securing it under a raft 60 and tethering it to the ocean floor by two cables 62 that are attached to the sides of the raft. This arrangement swings the Kinetic Harvester back and forth through the water as the raft rocks on the waves. It also takes power from the current going by. There are many other ways of positioning and supporting the Kinetic Harvester. The Kinetic Harvester can be customized to suit the location. It can be made larger or smaller, wider or narrower. Several small ones lined up on a common central shaft could be deployed along a beach to tap the power of the surf. Giant Harvesters with panels of two thousand square feet can deployed in the Gulf Stream.

On the larger production models the hinges on the panels would be replaced by an arrangement where the arms themselves would become the hinge-pins and the panels would fit on them like the hinges on the pins. All metal parts would be coated with a polymer coating to protect them from the seawater.

From the foregoing it will be seen that this invention is well adapted to attain all of the ends and objectives hereinabove set forth, together with other advantages which are inherent to the apparatus.

It will be understood that certain features and subcombinations are of utility and may be employed without reference to other features and subcombinations. This is contemplated by and is within the scope of the claims.

As many possible embodiments may be made of the invention without departing from the scope thereof, it is to be understood that all matter herein set forth or shown in the figures of the accompanying drawings is to be interpreted as illustrative and not in a limiting sense.